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10/608,236	06/27/2003	Gopal B. Avinash	135795	8574

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EXAMINER
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TABATABAI, ABOLFAZL

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/02/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/608,236

Applicant(s)

AVINASH, GOPAL B.

Examiner

Abolfazl Tabatabai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9, 13-15, 17-20, 24-26 and 28-30 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 10-12, 16, 21-23, 27, 31 and 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **Response to Amendment/Arguments**

1. Applicant's arguments, (pages 11-18), filed on January 22, 2007 with respect to the rejection of claim 25 under Harvey (U. S. 6,275,038 B1); have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Harvey (U. S. 6,275,038 B1) and Gur et al (U. S. 5,627,907).
2. In remarks, applicants argued in substance that, Harvey does not teach or suggest a method for generating an estimate of inhomogeneity as recited in claim 1, specifically does not describe or suggest a method that includes generating a first and a second estimate of inhomogeneity using an acquired image.
3. However, in response to Applicant's argument, Examiner would like to point out that claim language is given its broadest reasonable interpretation. The specification is not measure of invention. Therefore, limitations contained therein cannot be read into the claims for the purpose of avoiding the prior art. *Ir re Spork*, 55CCPA 743, 386 F. 2d 924, 155 USPQ 687 (1968). In the instant case, Harvey clearly reads " a method for evaluating an inhomogeneity in a magnetic polarizing field used to acquire an MRI image of a slice of a subject, at point in the slice, the method comprising acquiring data in a k-space for first and second k-space scans of the subject with the single application of a first MRI pulse sequence, wherein data acquisition for the second k-space scan is delayed with respect to data acquisition for the first k-space scan by a time delay; generating first and second spatial images from the first and second k-space scans;

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determining a phase difference between values of the first and second spatial images at the point; and evaluating the in homogeneity at the point using the phase difference and the time delay (please note, to column 3, lines 17-29) " a method that includes generating a first and a second estimate of inhomogeneity using an acquired image.

### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim1 is rejected under 35 U.S.C. 102(b) as being anticipated by Harvey (U. S. 6,275,038 B1).

Regarding claim 1, Harvey discloses a method for generating an estimate of inhomogeneity, said method comprising:

acquiring an image (please note, to column 3, lines 17-21).

generating a first estimate of inhomogeneity using the acquired image (please note, to column 3, lines 17-29 and column 4, lines 46-63 and column 13, lines 44-52);

generating a second estimate of inhomogeneity using the acquired image (please note, to column 3, lines 17-29 column 4, lines 46-63 and column 13, lines 44-52); and,

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generating a final estimate of inhomogeneity using at least the first and second estimates (please note, to column 4, lines 46-63).

### **Claim Rejections - 35 USC § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 3, 6-9, 15, 15, 25, 26 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey (U. S. 6,275,038 B1) in view of Gur et al (U. S. 5,627,907).

Regarding claim 2, Harvey is silent about the specific details regarding a method in accordance with claim 1 wherein said generating a first estimate comprises generating a first estimate by filtering an image gm, said generating a second estimate comprises generating a second estimate of inhomogeneity using an operation other than filtering on an image gm.

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises filtering on an image (column 17, lines 41-49).

It would have been obvious to a person of ordinary skill in the art at this time the invention was made to use image filtering as taught by Gur in the system of Harvey because Gur provides Harvey an improved CAD system with

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advantageous and useful to help radiologists and physicians obtain quicker and more precise results when analyzing mammograms. Such CAD systems would aid in cancer detection and improve the efficiency of large-scale screening.

Regarding claim 3, Harvey is silent about the specific details regarding a method in accordance with claim 2, wherein said generating a second estimate comprises generating a second estimate of inhomogeneity by dividing gm by a threshold value of gm (threshold gm).

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises generating a second estimate of inhomogeneity by dividing gm by a threshold value of gm (threshold gm) (column 9, lines 22-31 and column 20, lines 42-52).

It would have been obvious to a person of ordinary skill in the art at this time the invention was made to use image dividing and threshold value of image as taught by Gur in the system of Harvey because Gur provides Harvey an improved CAD system with advantageous and useful to help radiologists and physicians obtain quicker and more precise results when analyzing mammograms. Such CAD systems would aid in cancer detection and improve the efficiency of large-scale screening.

Regarding claim 6, Harvey is silent about the specific details regarding a method in accordance with claim 2, wherein said generating a first estimate by filtering an image gm comprises generating a first estimate by filtering an image gm with a low pass filter.

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In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises generating a first estimate by filtering an image gm with a low pass filter (column 21, lines 6-11).

Regarding claim 7, Harvey is silent about the specific details regarding a method in accordance with claim 1 wherein said generating a first estimate comprises generating a first estimate by filtering an image gm with a first filter, said generating a second estimate comprises generating a second estimate of inhomogeneity by filtering an image gm with a second filter different than the first filter.

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises generating a second estimate of inhomogeneity by filtering an image gm with a second filter different than the first filter (column 31, lines 4-5).

Regarding claim 8, Harvey is silent about the specific details regarding a method in accordance with claim 1 wherein said generating a first estimate comprises generating a first estimate by filtering an image gm with a first low pass filter, said generating a second estimate comprises generating a second estimate of inhomogeneity by filtering an image gm with a second low pass filter different than the first filter.

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital

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mammograms comprises

Regarding claim 9, Harvey is silent about the specific details regarding a method in accordance with claim 1 wherein said generating a first estimate comprises generating a first estimate by filtering an image gm with a low pass filter, said generating a second estimate comprises generating a second estimate of inhomogeneity by filtering an image gm with a band pass filter.

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises generating a second estimate of inhomogeneity by filtering an image gm with a band pass filter (column 17, lines 33-36).

It would have been obvious to a person of ordinary skill in the art at this time the invention was made to use first and second low-pass filter and band pass filter as taught by Gur in the system of Harvey because Gur provides Harvey an improved CAD system with advantageous and useful to help radiologists and physicians obtain quicker and more precise results when analyzing mammograms. Such CAD systems would aid in cancer detection and improve the efficiency of large-scale screening.

Regarding claim 25, Harvey discloses a computer readable medium encoded with a program configured to instruct a computer to:

acquire an image (please note, to column 3, lines 17-21).

generate a first estimate of inhomogeneity using the acquired image (please note, to column 3, lines 17-29 and column 4, lines 46-63 and column 13, lines 44-52);



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generate a second estimate of inhomogeneity using the acquired image (please note, to column 3, lines 17-29 and column 4, lines 46-63 and column 13, lines 44-52); and,

generate a final estimate of inhomogeneity using at least the first and second estimates (please note, to column 4, lines 46-63).

Harvey is silent about the specific details regarding a computer readable medium for storing a program and images.

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises a computer readable medium for storing a program (please note, to fig. 1, element 2, and column 7, lines 7-15).

It would have been obvious to a person of ordinary skill in the art at this time the invention was made to use a computer readable medium for storing a program as taught by Gur in the system of Harvey because Gur provides Harvey an improved CAD system with advantageous and useful to help radiologists and physicians obtain quicker and more precise results when analyzing mammograms. Such CAD systems would aid in cancer detection and improve the efficiency of large-scale screening.

Claim 26 is similarly analyzed as claim 2 above.

Claim 28 is similarly analyzed as claim 7 above.

Claim 29 is similarly analyzed as claim 8 above.

Claim 30 is similarly analyzed as claim 9 above.

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8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey (U. S. 6,275,038 B1) in view of Dean et al (U. S. 6,445,182).

Regarding claim 13, Harvey discloses a magnetic resonance imaging (MRI) system comprising:

acquire an image (please note, to column 3, lines 17-21);

generate a first estimate of inhomogeneity using the acquired image (please note, to column 3, lines 17-29 and column 4, lines 46-63 and column 13, lines 44-52);

generate a second estimate of inhomogeneity using the acquired image (please note, to column 3, lines 17-29 and column 4, lines 46-63 and column 13, lines 44-52); and,

generate a final estimate of inhomogeneity using at least the first and second estimates (column 4, lines 46-63).

However, Harvey is silent about the specific details regarding the steps of:

a computer operationally coupled to said receiver, said computer configured to.

a main magnet configured to generate a substantially uniform magnetic field;

a radio frequency pulse generator configured to excite the magnetic field;

a gradient field generator configured to generate gradients extending in different directions in the magnetic field; and,

a receiver configured to receive magnetic field magnetic resonance (MR) signals representative of an object.

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In the same field (medical imaging) of endeavor, however, Dean discloses geometric distortion correction in MRI comprising the steps of:

a computer operationally coupled to said receiver, said computer configured to (fig. 3 element 110).

a main magnet configured to generate a substantially uniform magnetic field (column 7, lines 47-55);

a radio frequency pulse generator configured to excite the magnetic field (column 7, lines 56-60);

a gradient field generator configured to generate gradients extending in different directions in the magnetic field (column 7, lines 56-60); and,  
a receiver configured to receive magnetic field magnetic resonance (MR) signals representative of an object (column 7, lines 61-66).

It would have been obvious to a person of ordinary skill in the art at this time the invention was made to use uniform magnetic field, radio frequency and a receiver as taught by Dean in the system of Harvey because Dean provides Harvey an improved MRI system which is relates to the field of geometric distortion correction in MRI. Using computed tomography is useful in imaging bony structure yet has limited ability to differentiate between components of inhomogeneous soft tissue structures, such as a brain for example. Also computed tomography provides images of relatively high positional accuracy.

9. Claims 14, 15, 17-20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harvey (U. S. 6,275,038 B1) and Dean et al (U. S. 6,445,182) as applied to claim 13 above, and further in view of Gur et al (U. S. 5,627,907).

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Regarding claim 14, Harvey and dean are silent about the specific details regarding a MRI system in accordance with claim 13 wherein said computer further configured:

generate the first estimate by filtering an image gm; and generate the second estimate of inhomogeneity using an operation other than filtering.

In the same field (medical imaging) of endeavor, however, Gur discloses computerized detection of masses and micro calcifications in digital mammograms comprises filtering on an image (column 17, lines 41-49).

It would have been obvious to a person of ordinary skill in the art at this time the invention was made to use image filtering as taught by Gur in the system of Harvey because Gur provides Harvey an improved CAD system with advantageous and useful to help radiologists and physicians obtain quicker and more precise results when analyzing mammograms. Such CAD systems would aid in cancer detection and improve the efficiency of large-scale screening.

Claim 15 is similarly analyzed as claim 3 above.

Claim 17 is similarly analyzed as claim 6 above.

Claim 18 is similarly analyzed as claim 7 above.

Claim 19 is similarly analyzed as claim 8 above.

Claim 20 is similarly analyzed as claim 9 above.

Claim 24 is similarly analyzed as claim 14 above.

### **Allowable Subject Matter**

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10. Claims 4, 5, 10-12, 16, 21-23, 27, 31 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### **Other prior art Cited**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Benaron et al (U S 5,752,519) disclose device and method for detection, localization, and characterization of inhomogeneities in turbid media.

Zhang et al (U S 6,263,228 B1) disclose method and apparatus for providing separate water-dominant and fat-dominant images from single scan single point Dixon MRI sequences.

Maeda et al (U S 5,113,865) disclose method and apparatus for correction of phase distortion in MR imaging system.

### **Contact Information**

11. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to ABOLFAZL TABATABAI whose telephone number is (571) 272-7458.

The Examiner can normally be reached on Monday through Friday from 9:30 a.m. to 7:30 p.m. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Bhavesh Mehta, can be reached at

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(571) 272-7453. The fax phone number for organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Abolfazl Tabatabai

Patent Examiner

Technology Division 2624

March 23, 2007

*A-Tabatabai*